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Forest Insect and Disease Management

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BIOLOGICAL
EVALUATION R2-76-5

MOUNTAIN PINE BEETLE

Bighorn Front Range

Bighorn National Forest,
BLM, State and Private Land

September 1976

Rocky Mountain Region

U.S. Department of Agriculture Forest Service

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INTRODUCTION

The mountain pine beetle, Dendroctonus ponderosae Hopkins, continues to cause ponderosa pine mortality along the Bighorn Front Range on National Forest, BLM, State and private lands.

During July 13 and 14, Entomologist Donn Cahill made an aerial sketch-mapping flight over known bark beetle outbreaks on the Bighorn Front Range. Simultaneously Entomologist Larry Yarger and Biological Technician Kent Eggleston made an on-the-ground assessment of these insect infestations. Knight's (1960) "Sequential Sampling of Black Hills Beetle Population" was used to make trend predictions for the 1976 infestation. Samples showed that the insect population was increasing.

TECHNICAL INFORMATION

Causal Agent: Mountain pine beetle, Dendroctonus ponderosae Hopkins.

Host Tree Attacked: Ponderosa pine, Pinus ponderosae Laws.

Extent of Infestation: Losses continue to occur in over-stocked stands throughout the Bighorn Front Range from Clear Creek north to the Montana State line. Mountain pine beetle infested groups ranged from a few to five hundred trees (see map).

Life History: The mountain pine beetle has one generation per year. Adults attack trees mid-July through early September by boring through the bark to the cambium, then tunnel upward for 12 to 30 inches. The females lay eggs in individual niches along each side of the gallery which is then packed with partically-digested wood particles called frass. After hatching, the larvae feed in individual channels at right angles to the egg gallery in the phloem. The insect overwinters in the larval stage. In the spring, larvae development is completed, they excavate an oval chamber at the end of the larval gallery and pupate. Mature adults emerge from these chambers by boring to the outer bark surface, fly to attack new trees, and start another generation.

METHODS

Using Knight's (1960) Sequential Sampling Plan, two 6-by-6-inch samples were taken at dbh on opposite sides of infested ponderosa pine trees. Samples were taken at 3 sites: Sand Turn Observation Point, Crystal Spring Draw and Red Grade Springs.

RESULTS AND DISCUSSION

Samples were taken to estimate population trend for the Bighorn Front Range and not for specific locations. The brood samples indicated that a population increase could be expected with 9.5 new adults per sample.

Operable slopes with existing roads should be thinned, utilizing small timber sales and/or salvage sales. Sales should be designed to reduce the growing stock level to 60 to 90 sq. ft. per acre dependent upon site class. Thinned stands (< 90 growing stock level) will minimize mountain pine beetle activity and in most cases will open the site to regeneration and browse plant species.

In a few high value areas, direct control may be justified because of favorable benefit/cost; however, direct control alone may only extend tree losses over longer periods of time since it doesn't change the beetle environment. Chemical treatment may disperse the beetle population and encourage continuation of the epidemic (Williamson, 1971). Previous chemical suppression efforts for the mountain pine beetle in lodgepole pine and the southern pine beetle in southern pine have met with sporadic results (Amman and Baker, 1972; Lario and Bennett, 1974).

It has been about 20 years since chemical treatment was started on the Bighorn and stand structure still has not been altered to a suitable B. A. In fact the B.A. has increased over time and more stands have become susceptible to mountain pine beetle outbreaks. The key factor in regulating beetle population dynamics is manipulation of stand structure by reduction of stand basal area and maintainance of stand vigor. Stand improvement programs would not only treat the symptom, but the cause, and increase most resource values.

RECOMMENDATIONS

1. Thin beetle susceptible stands to a growing stock level of 60 to 90 sq. ft./acre through timber sales or other thinning programs.

2. Chemical treatment for beetle suppression is not recommended, except to protect high value developed areas where such treatment is also accompanied by a stand management program to reduce growing stock levels as recommended in #1 above.

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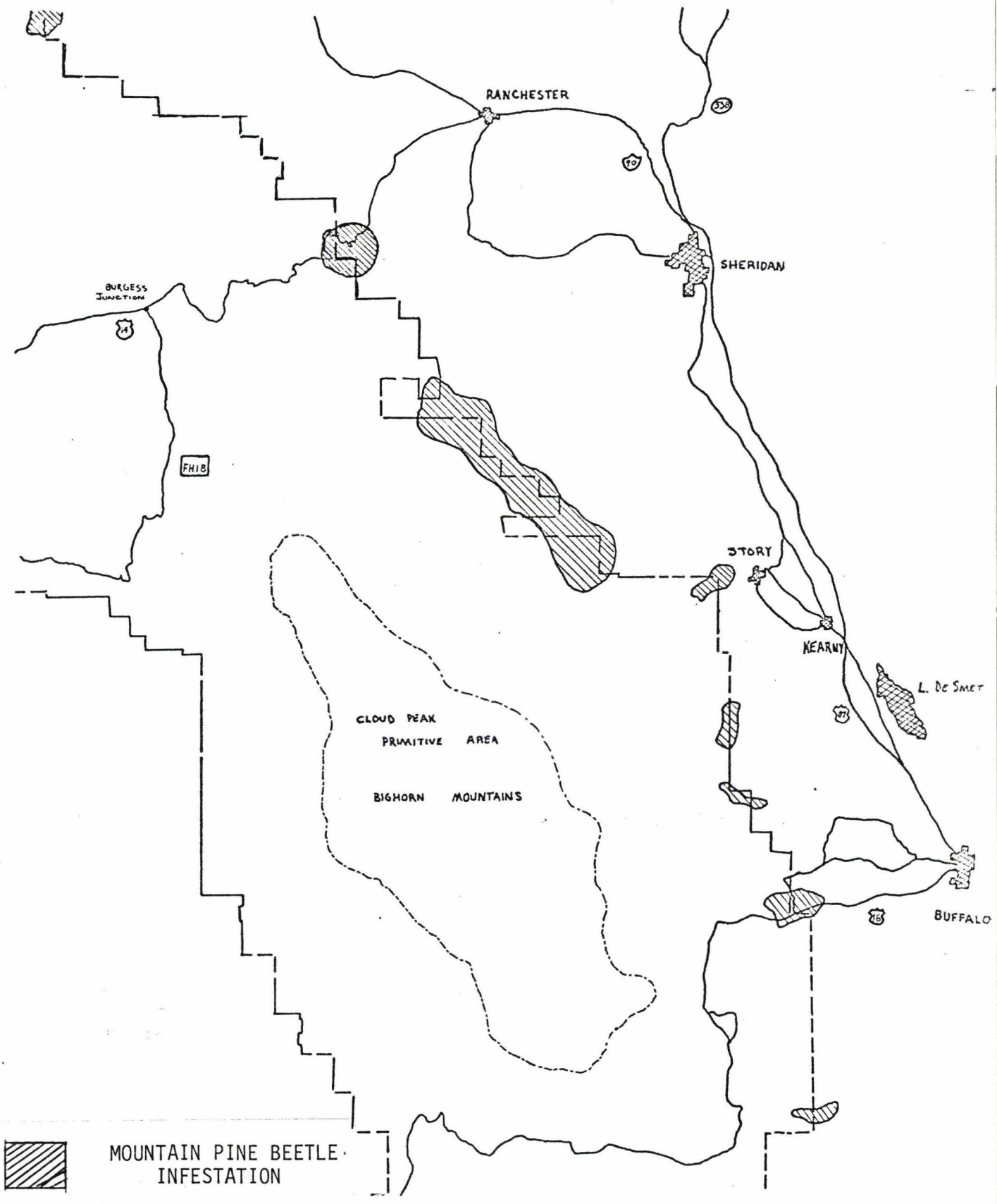
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